

## REMARKS

These remarks are in response to the Office Action mailed April 11, 2003, and for which a three month extension is hereby requested. The Office Action rejected all of the pending claims, claims 4-14, 33-51, 71-82, and 89-94, under 35 U.S.C. 102(e) as anticipated by either Aoki et al., U.S. patent number 6,243,220, or Fielder et al., U.S. patent number 6,446,037, or under 35 U.S.C. 103(a) with either Aoki or Fielder as the primary reference. For the reasons stated below, these rejections are respectfully submitted to be in error. Claim 33 has been amended to further distinguish it from the prior art, claim 34 has been amended and rewritten in independent form, and claim 35 has been rewritten in independent form, as described below under the appropriate heading. Additionally, the title has been amended and the non-elected claims have been cancelled, in conformance with the comments of the Office Action.

### Rejections under 35 U.S.C. 102(e) based on Aoki

Claims 7, 8, 71, 74-76, and 81 are rejected under U.S.C. 102(e) as anticipated by Aoki et al., U.S. patent number 6,243,220. It is respectfully submitted that the rejection of these claims based on Aoki is not well founded and should be withdrawn.

The teachings of Aoki are directed at an apparatus that allows the after-recording of audio information onto videotape. This is clear from the first sentence of the Summary of Aoki, at column 3, lines 34-38, where the emphasis is added: "It is an object of the present invention to provide a recording and reproducing apparatus which allows *the after-recording* and recording/reproduction of the audio signal while matching of the audio mode of the audio signal is maintained in the after-recording." By after-recording, Aoki means the re-recording of *additional, independent sound* that can be played from the same medium as an alternative to the originally recorded sound. This allows for the either the original sound or the after-recorded sound, for example a dual language broadcast (e.g. column 1, lines 60). That the after-recording corresponds to added independent sound is shown in Table 1 with the "Added Indep. Sound" heading, where the control bits of the table describe the relationship of the various sound channels and whether these are part of the same sound signal or separate, independent sound signals.

These control signals are supplied (“control signal of the audio input signal is *supplied* ...” [column 4, lines 36-37, emphasis added]) independently of the audio signal and are not derived from the audio signals. In fact, as the source of the different portions of the audio originate from different audio sources and may be unrelated for an after-recording process, the control signals cannot be derived from the multiple, independent audio signals, but must be supplied by the person performing the after recording. It is this ability to record two independent audio signals (the original and the after-recording), each of which needs to be synced with the video (as opposed to being the same signal as in the prior art to Aoki), to which the teaching of Aoki are directed.

Aoki describes the recording of these different sound channels onto videotape with the structure shown in Figure 2, as described at column 5, lines 5-10. In this Figure, numeral 38 denotes the direction of the head scan. When the tape is played, the head will sequentially pass over AUDIO SIGNAL AREA A, VIDEO SIGNAL AREA V, and the AUDIO SIGNAL AREA B, where the audio information in areas A and B both correspond to the video information in area V. As the tape runs, it will pass successively through a series of areas with the structure. Thus, the areas A, V and B are all part of the same medium, both physically and as to their structure, and a single segment within the single medium. That it is a single medium is quite basic to the teachings of Aoki as it for after-recording added independent audio for the purpose of reproducing it with the video as the medium is played. As noted above, the control signal is separately provided with this separate audio signal in order to match it to video content already on the tape.

It should also be noted that the teachings of Aoki are very specific to the medium and structure of the video; namely, that there are two separate audio areas (A and B) associated with one another through their relationship to another particular area (V) and where there is a set of control bits which can be set to specify the relation among the different areas.

Thus, Aoki describes using two independent audio signals on a signal medium, whereas the present invention is concerned with taking a single audio signal and storing data derived from it on two different media. Further, the control signals cited by the Office Action from Aoki are provided separately from the audio data and decided beforehand, rather than being data derived from the single audio signal. Consequently, it is respectfully submitted

that the teachings of Aoki are distinct and, in many respects, the opposite of those of the present application. These distinctions are reflected in the pending claims.

More specifically, with respect to claim 7, this contains the limitation of "*deriving from the audio signal* data, comprising ... *control information*," where the emphasis has been added. For this element, the Office Action refers to the signals b1-b6. As discussed above, these are not *derived* from *an* audio signal, but rather separately supplied and used to described the relationship of the different audio signals to the each other.

Claim 7 also contains the limitation of

A method for storing *an* audio signal ... ,comprising: *deriving from the audio signal a plurality of digital signals*, ... storing [a] first [of said plurality of digital signals] *on a first medium* [and] storing the remainder of said plurality of digital signals *on one or more second media*,...

where the emphasis is again added. Thus, claim 7 describes a process of taking a *single* audio signal and deriving a plurality of signals from it, then storing a first of these on a *first* medium and the rest on a *second* medium. As again described above, this is in opposition to the teachings of Aoki which describe storing *multiple, independent* audio signals on the *same* media.

(If reference to this element of claim 7, Office Action refers to column 5, lines 11-63, and column 6, lines 3-64. For these cited areas, the discussion in Aoki is just for the recording in *one area* (of A and B in Figure 2) being used for after-recording (i.e., for a *second* audio signal). As noted at column 5, lines 40-43: "A so-called after-recording in which *only one of the signal areas* on the recorded magnetic tape ...", where the emphasis is added. This is also noted at column 6, lines 26-34.)

In its entirety, claim 7 reads:

A method for storing *an* audio signal of two or more channels, comprising:  
*deriving from the audio signal* data, comprising:  
    *a plurality of digital signals*, wherein a first of said plurality of digital signals is a first two track audio signal; and  
    *control information*, wherein a reproduction of said audio information can be produced from said plurality of digital signals by use of said control information;  
    storing said first digital signal *on a first medium*;  
    storing the remainder of said plurality of digital signals *on one or more second media*; and  
    storing the control information.

For any of the given reasons, independent claim 7 and its dependent claims, claims 8-14, are believed allowable.

Concerning independent claim 71, this claims contains similar features to claim 7 and is believed allowable for reasons similar to those discussed above with respect to claim 7. More specifically, claim 71 reads:

A method for storing an N-channel audio signal, wherein N is an integer greater than two, comprising:  
deriving from said N-channel audio signal a two channel representation;  
recording said two channel representation on a first medium;  
forming additional information, comprising:  
a residual dependent upon the difference between said N-channel audio signal and said two channel representation; and  
control information, including data that can be used to recombine said residual with said two channel representation to reconstruct an M-channel representation of said N-channel audio signal, wherein M is greater than two but not greater than N;  
recording said residual on one or more second media; and  
recording said control information.

Thus, claim 71 again describes first and second data (the “two channel representation” and the “residual”) derived from a signal audio signal and respectively recorded on a *first* medium and one or more *second* media. The control information describes how to recombine these signals to produce a representation of the original audio signal. For any of the given reasons described above with respect to claim 7, independent claim 71 and its dependent claims, claims 72-82, are believed allowable.

(Concerning claim 74, the Office Action states: “NOTE: when only two channels are selected,  $M=N$ ”. It should be noted that claim 71, upon which claim 74 depends, explicitly states that “N is an integer greater than two” and “M is greater than two but not greater than N”, so that neither N nor M is equal to 2. Also, concerning the NOTE in the Office Action with respect to claim 76, the meaning of the comment is unclear, but appears to be inconsistent with the requirement that both  $N>2$  and  $M>2$ .)

#### Rejections under 35U.S.C. 102(e) based on Fielder

Claims 33, 34, and 48-51 are rejected under U.S.C. 102(e) as anticipated by Fielder et al., U.S. patent number 6,446,037. It is respectfully submitted that the rejection of these

claims based on Fielder is not well founded and should be withdrawn. Claim 33 has been amended to further distinguish it from the prior art and claim 34 has been amended and rewritten in independent form.

As noted in the Office Action, the teachings of Fielding are drawn to the recording of audio, but where the recorded audio can be reproduced at differing levels of resolution. This is done by storing additional audio information, from which the higher resolution sound can be obtained in the "subband" (see column 6, starting at line 18), as described there with respect to Figures 3A and 3B. This additional audio information (the augmentation portions 320, 300) is on the same medium as the standard audio portion (the core layer 310) and when the medium is played, these different areas are accessed as part of the same, single reading process. This is the sort of prior art technique described in the Background of present application on page 3, lines 3-22; these techniques also have the drawbacks described therein.

In a principle embodiment of one of the main aspects of the present invention, a two track lower resolution version (such as is the standard for a conventional audio CD) of a high resolution audio signal is stored on the audio portion of a compact disk (CD) playable on a standard CD player. Additional audio data allowing a higher resolution are also stored, but, unlike Fielding where the additional audio data is also stored in the same medium (hidden in the "subband"), the present invention stores this additional audio data in a different location, outside of the audio portion of the standard CD. In a principle embodiment, this additional audio data, or "residual", is stored in a CD-ROM zone on the same physical disc, although a number of alternate physical media are described beginning on page 32, line 5, of the present application. The CD-ROM zone of the CD is not accessed on a standard CD player, requiring either a CD-ROM player or a special audio CD player, as described in another aspect of the present invention. It is respectfully submitted that the various aspects of the present invention are neither anticipated by, nor obvious from, the teachings of Fielder and that these distinctions are reflected in the claims.

More specifically, claim 33 (as amended) reads:

A method for recording a two channel audio signal, comprising:  
providing a master recording;  
deriving from said master recording a reduced digital reproduction of  
lower resolution than said master recording;  
recording said reduced digital reproduction *onto a first medium*;

forming additional information, comprising:

a residual dependent upon the difference between said master recording and said reduced digital reproduction; and

control information, including data that can be used to recombine said residual with said reduced digital reproduction to reproduce said master recording;

recording said residual *onto a location other than said first medium*; and  
recording said control information.

As indicated by the added emphasis, the lower resolution version (the "reduced digital reproduction") of the two original channel signal (the "master recording") is stored on a first media, while additional audio data (the "residual dependent upon the difference between said master recording and said reduced digital reproduction") is stored at different location. Consequently, "to recombine said residual with said reduced digital reproduction to reproduce said master recording" using the control information requires the reading of data from two separate locations: the reduced reproduction from the first medium and the residual from the other, second location. This is distinct from Fielding, where both the "core layer" (Figure 3, 310) and the "augmentation layers" (320, 330) are stored on the same medium and, further, within the same frame (340) of the medium.

Consequently, it is respectfully submitted that a rejection of claim 33 under U.S.C. 102(e) as anticipated by Fielder is not well-founded and that claim 33 and its dependent claims, claims 50 and 51, are allowable over the prior art.

Concerning claim 34, this is drawn to the same aspect of the present invention as claim 33, but contains the limitation that the medium on which the "reduced digital reproduction" is "the audio portion of a compact disk (CD) playable on a standard CD player". Consequently, claim 34 is believed allowable for the same reasons as described above with respect to claim 33.

Claim 34 has been amended and rewritten in independent form and reads:

A method for recording a two channel audio signal, comprising:  
providing a master recording;

deriving from said master recording a reduced digital reproduction of lower resolution than said master recording;

recording said reduced digital reproduction, *wherein the recording of said reduced digital reproduction is performed onto the audio portion of a compact disk (CD) playable on a standard CD player*;

forming additional information, comprising:

a residual dependent upon the difference between said master recording and said reduced digital reproduction; and

control information, including data that can be used to recombine said residual with said reduced digital reproduction to reproduce said master recording;

recording said residual onto *a location other than the audio portion of said compact disk (CD) playable on a standard CD player*; and  
recording said control information.

As the added emphasis indicates, the present invention stores the reduced version of the master recording “onto the audio portion of a compact disk (CD) playable on a standard CD player”, whereas the residual is stored elsewhere. This is in distinction to the teachings of Fielding, where the “augmentation layers” would also be stored on the audio portion of the medium, more specifically within the same frame on a frame-by-frame basis.

Also, in its remarks with respect to claim 34, for the additional limitation of “the recording of said reduced digital reproduction is performed onto the audio portion of a compact disk (CD) playable on a standard CD player”, the Office Action cites column 1, lines 12-22, and column 19, line 51, to column 20, line 13, of Fielder. Although Fielder does refer to compact discs at column 1, lines 12-22, this is only to state that the commercial success of the CD has led to a particular resolution has become an industry standard. Fielding then goes on to develop the method of “scalable coding” that it describes. Neither of the cited locations teach or suggest the application of these methods to placing such scalable coding on the audio portion of a compact disk, and, more specifically, the Applicant can find no indication, either in the cited locations or elsewhere in Fielding, of them being applied to “the audio portion of a compact disk (CD) playable on a standard CD player”.

Consequently, for any of these reasons, it is respectfully submitted that a rejection of claim 34 under U.S.C. 102(e) as anticipated by Fielder is not well-founded and that claim 34 and its dependent claims, claims 36-49, are allowable over the prior art.

Concerning claim 49, which is also rejected under U.S.C. 102(e) as anticipated by Fielder, although the cited location of Fielding (column 9, line 52, to column 10, line 14) refers to the compression of data, there is no disclosure of including data on how the compression is performed in the control data. Consequently, claim 49 is further believed allowable for this reason.

(Concerning claims 50, the Office Action cites column 9, line 52, to column 10, line 14, for the limitation that “the recording of said reduced digital reproduction is performed

onto a rewritable memory." The Applicant cannot find a reference to the use of a rewritable memory in the cited location and it is unclear to what the Office Action is referring. Similarly, the Applicant cannot find the reference to compressing data at the location (column 1, lines 12-22) in Fielder cited with respect to claim 51. The Office Action appears to have reversed the citations.)

Claims 4-6, 9-14, 72, 73, 77, 78, 82, and 89-94

Claims 4-6, 9-14, 72, 73, 77, 78, 82, and 89-94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki and further in view of Lowe et al., U.S. patent number 5,695,401. Claims 9-14 are believed allowable as they depend upon claim 7 for their base claim, which is believed allowable for the reasons described above. Claims 72, 73, 77, 78, 82 are similarly believed allowable as they depend upon claim 71 for their base claim, which is also believed allowable for the reasons described above. A number of these claims are further believed allowable for the reasons stated below. Claims 4-6 and 89-94 are believed allowable for similar reasons, as also described below.

As noted above, the teachings of Aoki are quite specific to the structure of the video tape medium as they are directed to a pair of distinct audio areas correspond to a given video area and the placement of distinct audio signals in the separate audio areas and do not combine in an obvious way with the teachings of Lowe. Lowe does describe the use a number of different media in the cited location, but none of these consider the storage of different data derived of the same audio signal on differing media. Consequently, it is respectfully that neither Aoki nor Lowe, either alone or in conjunction, teach, suggest, or indicate the principle aspects of the present invention. Further, it should be noted that Lowe is concerned with video data in an interactive medium, while Aoki is concerned with the after-recording of audio data corresponding to a video signal and that neither is particularly interested, as principle feature, in storing audio information in the most efficient way.

Concerning claim 10, the cited location of Lowe (column 36-55) provides no description of an "audio portion of a compact disk.(CD), wherein said first digital signal can be reproduced on a conventional CD player." The cited location (column 5, lines 36-55) describes only the use of a CD-ROM and video data. There is no suggestion of audio data playable in a

standard CD player, as opposed to video data in a CD-ROM player. Consequently, claim 10 is further believed allowable for these reasons.

Considering claims 11 and 12, although Lowe mentions a number of media in the cited location, including CD-ROM, there is no indication or suggestion of storing audio data derived from the same audio signal stored in the standard, audio CD portion in the CD-ROM portion of the same physical CD. This is also true of the corresponding control data as described in claim 7.

Concerning claim 14, the Office Action refers to column 4, 35-43, of Aoki. The Applicant can find no discussion or suggestion of the resolution or the signal, either in the cited portion or elsewhere in Aoki. Further, the Office Action states: "NOTE: When more tracks are added inherently resolution becomes higher." This is respectfully submitted to be incorrect: the resolution and the number of tracks are distinct and independent aspects of the audio signal. For instance, a two-track signal may be of very high resolution, while a multi-track signal may be of low resolution: the adding of track does not increase the level of resolution, but only increases the number of tracks. Consequently, it is respectfully submitted that this additional ground for the rejection of claim 14 is without basis.

Concerning claim 4, the Office Action rejects claim 4 for the same reasons as claim 7, with Lowe invoked to supply the specified media of a conventional audio CD. Consequently, claim 4 is believed allowable for the reasons given above with respect to claims 4 and 10.

Concerning the use of a conventional audio CD as the media for storing "the first two track audio signal" of claim, as noted above, Lowe provides no description of an "audio signal reproducible ... on a conventional", but only a discussion of video on CD-ROMs. Also, as correctly noted in the Office Action, Aoki has no disclosure on the use of a CD; further, as described above with respect to claim 7, the teachings of Aoki are quite specific to the particular video tape media described therein.

As to how the audio data content is stored on the CD, as is also described above with respect to claim 7, Aoki is concerned with after-recording an independent audio signal to go with the video signal so that either the original audio or the after-recorded audio can be available to be presented with the video. Aoki does not describe storing a first part of an

audio signal (the "first two track audio signal") on a first media (the "conventional audio CD" area) and a second part of an audio signal (the "additional audio data") in another location ("outside of said audio portion"), where these parts of the audio signal can be "combined through use of said control information to reproduce a unified audio signal.

Consequently, for any of these reasons, independent claim 4 and its dependent claims, claims 5 and 6, are believed allowable.

Claim 5 is further believed allowable for the reasons given above with respect to claim 14.

Concerning claims 72 and 73, the Office Action rejects these for the same reasons as for the rejection of claims 11 and 12. Consequently, it is respectfully submitted that claims 72 and 73 are further believed allowable for the same reasons as those given above for claims 11 and 12.

Concerning claim 78, it is respectfully submitted that the cited location of Lowe (column 5, lines 36-55) does not describe "wherein *control information* contains data on how said *residual* is compressed", where the emphasis has been added. The cited location does mention *video* compression techniques, but does not suggest or indicate including information on how the data is compressed in control information. Rather, it describes the video as conforming to either one video standard, where the compression indication data could be part of the standard and not require explicit specification, or another standard, where the compression indication data could be part of the standard and not require explicit specification. Further, claim 78 states that the compression data is for the *residual* signal, not the two-channel representation on the first media.

The Office Action rejected claim 89 for the same reasons as claim 4. Consequently, claim 89 and its dependent claims, claims 90-94, are believed allowable for the same reasons as given above with respect to claim 4.

Claim 91 is additionally believed allowable for the reasons given above with respect to claim 78. Additionally, the Office Action states: "NOTE: Control information inherently has to disclose how data is compressed for the system to work." It is respectfully submitted

that the Examiner is improperly stating what is inherent without providing supporting evidence. For instance, if a compression is part of a given standard for a data type, it need not be explicitly specified in the control data.

Claims 35-47

Claims 35-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fielder and further in view of Kakubo et al., U.S. patent number 5,365,468. Claims 41-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fielder and Kakubo and further in view of Oomen et al., U.S. patent number 5,649,054. As noted above, claims 36-47 all have claim 34 as their base claim and are consequently believed allowable for this reason alone. Due to their additional limitations, these claims are all believed further allowable for a number reasons; however, these will not be discussed at this time to same space in the already lengthy Remarks of this Amendment.

Concerning claim 35, this has now been rewritten into independent form by incorporating (in their original form) underlying claims 33 and 34. Consequently, claim 35 is believed allowable for much the same reasons described above with respect to those claims. More specifically, claim 35 includes the limitation that “the recording of said reduced digital reproduction is performed onto the audio portion of a compact disk (CD) playable on a standard CD player” and that the residual is recorded in a second location, which is not found in the prior art. Claim 35 further adds that the “control information, including data that can be used to recombine said residual with said reduced digital reproduction to reproduce said master recording” is also stored in this second location, which is also a limitation not found in the prior art.

The Office Action rejects claim 35 U.S.C. 103(a) as being unpatentable over Fielder and further in view of Kakubo; however, in its rejection of claim 35 the Office Action makes no reference to Kakubo. Consequently, the Office Action is rejecting claim 35 under 35 U.S.C. 103(a) as being obvious based upon only the Fielder reference.

This rejection under 35 U.S.C. 103(a) over only Fielder as a single reference is respectfully traversed. It is admitted in the Office Action that claim 35 recites some feature which the Fielder patent “does not specifically disclose.” Yet there is no further reference or

other evidence of prior art presented to demonstrate that the overall claimed combinations including the elements missing from Fielder would have been obvious. The Office Action either summarily states that adding the missing element to Fielder in order to meet the terms of the claims "provide no new or unexpected results", or that it "would have been routine experimentation and optimization in the absence of criticality", so that the elements missing from Fielder were well known and would have been obvious to include in the claimed combinations. In either case, assumptions have improperly been made by the Examiner as to what one ordinarily skilled in the art would have found obvious to do since there is no supporting evidence provided in the Office Action. It is respectfully submitted that these rejections do not make the necessary *prima facie* case of obviousness, and that, on that basis, the rejection of claim 35 must be withdrawn.

More specifically, claim 35 contains the additional feature that "the recording of said residual and the recording said control information are performed onto the CD-ROM portion of said CD." As the Office Action notes, Fielder neither discloses nor suggests such a limitation. The CD-ROM portion of the CD is distinct from the audio portion of a compact disk playable on a standard CD player. All of Fielding's teachings are directed at placing both the lower resolution part of the audio signal and the corresponding augmentation portion on the same media and, moreover, within the same frame so that they can be accessed together. Consequently, rather than the invention of claim 35 being obvious from Fielder, it is respectfully submitted that Fielder teaches away from the present invention.

As to the Office Action's claim that the present invention as embodied claim 35 "provide[s] no new or unexpected results", such results are described in the Summary of the present application beginning on line 9 of page 4. Both with respect to this comment and that this aspect of the present invention "would have been routine experimentation and optimization", the Examiner is making improper assumptions based on hindsight gained from the present application. The invention of claim 35 contains a number of elements lacking in and believed non-obvious from the prior art in general and Field in particular and does not just describe varying a set of parameters or otherwise optimizing an existing method.

For any of these reasons claim 35 is believed allowable.

Claims 79 and 80

Claims 79 and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki and further in view of Moorer, U.S. patent number 6,0728,878. As these claims depend upon claim 71, they are believed allowable for the reasons described above to that claim. They are further believed allowable as Moorer is not applicable as prior art against the present application.

35 U.S.C. 102(e) reads, in part:

A person shall be entitled to a patent unless the invention was described in a patent granted on an application for patent *by another* filed in the United States before the invention thereof ...

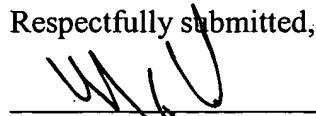
As the added emphasis shows, this section only applies if the patent is by a different inventive entity. The Moorer of U.S. patent number 6,0728,878 is the same as the inventor of the present patent application and, consequently, not a patent granted on a application *by another*. Consequently, claims 79 and 80 are further believed allowable.

Conclusion

For any of these reasons, reconsideration of the Office Action's rejection of claims 4-14, 33-51, 71-82, and 89-94 is therefore respectfully requested, and an early indication of their allowability is earnestly solicited.

Additionally, Applicant draws the Examiner's attention to a pair of Information Disclosure Statements filed on August 10, 2001, and June 19, 2000. No indication is given of these having been considered. Consideration of these Information Disclosure Statements is also respectfully requested.

Respectfully submitted,

  
\_\_\_\_\_  
Michael G. Cleveland  
Reg. No. 46,030

PARSONS, HSUE & DE RUNTZ LLP  
655 Montgomery Street, Suite 1800  
San Francisco, CA 94111  
(415) 318-1160  
(415) 693-0194 (Fax)

Appendix

Pending Claims

(Claims 1-3 have been cancelled.)

4. A method of storing audio data on a CD, comprising:
  - storing in the audio portion of said CD a first two track audio signal, wherein said first two track audio signal is reproducible by playing said CD on a conventional audio CD player;
  - storing additional audio data on said CD outside of said audio portion; and
  - storing control information on said CD, wherein said first two track audio signal and said additional audio data can be combined through use of said control information to reproduce a unified audio signal.
5. The method of claim 4, wherein said unified audio signal comprises a second two track audio signal of higher resolution than said first two track audio signal.
6. The method of claim 4, wherein said unified audio signal comprises more than two channels.
7. A method for storing an audio signal of two or more channels, comprising:
  - deriving from the audio signal data, comprising:
    - a plurality of digital signals, wherein a first of said plurality of digital signals is a first two track audio signal; and
    - control information, wherein a reproduction of said audio information can be produced from said plurality of digital signals by use of said control information;
    - storing said first digital signal on a first medium;
    - storing the remainder of said plurality of digital signals on one or more second media; and
    - storing the control information.

8. The method of claim 7, wherein said first medium is a rewritable memory.

9. The method of claim 8, further comprising:  
compressing said first digital signal prior to storing on said first medium.

10. The method of claim 7, wherein said first medium is the audio portion of a compact disk (CD), wherein said first digital signal can be reproduced on a conventional CD player.

11. The method of claim 10, wherein said one or more second media is the CD-ROM portion of said CD.

12. The method of claim 11, wherein said control information is stored in the CD-ROM portion of said CD.

13. The method of claim 7, wherein said audio signal audio comprises more than two channels.

14. The method of claim 7, wherein said reproduction of said audio signal comprises a second two track audio signal of higher resolution than a reproduction based on said first two track audio signal alone.

(Claims 15-32 have been cancelled.)

33.(Amended) A method for recording a two channel audio signal,  
comprising:

providing a master recording;  
deriving from said master recording a reduced digital reproduction of lower resolution than said master recording;

recording said reduced digital reproduction onto a first medium; forming additional information, comprising:

a residual dependent upon the difference between said master recording and said reduced digital reproduction; and

control information, including data that can be used to recombine said residual with said reduced digital reproduction to reproduce said master recording;

recording said residual onto a location other than said first medium; and recording said control information.

34.(Amended) A method for recording a two channel audio signal, comprising:

providing a master recording;

deriving from said master recording a reduced digital reproduction of lower resolution than said master recording;

recording said reduced digital reproduction, wherein the recording of said reduced digital reproduction is performed onto the audio portion of a compact disk (CD) playable on a standard CD player;

forming additional information, comprising:

a residual dependent upon the difference between said master recording and said reduced digital reproduction; and

control information, including data that can be used to recombine said residual with said reduced digital reproduction to reproduce said master recording;

recording said residual onto a location other than the audio portion of said compact disk (CD) playable on a standard CD player; and

recording said control information.

35.(Amended) A method for recording a two channel audio signal, comprising:

providing a master recording;

deriving from said master recording a reduced digital reproduction of lower resolution than said master recording;

recording said reduced digital reproduction, wherein the recording of said reduced digital reproduction is performed onto the audio portion of a compact disk (CD) playable on a standard CD player;

forming additional information, comprising:

a residual dependent upon the difference between said master recording and said reduced digital reproduction; and

control information, including data that can be used to recombine said residual with said reduced digital reproduction to reproduce said master recording;

recording said residual; and

recording said control information, wherein the recording of said residual and the recording said control information are performed onto the CD-ROM portion of said CD.

36. The method of claim 34, wherein said master recording is a digital recording characterized by an original sampling frequency, and wherein the deriving of said reduced digital reproduction comprises downsampling said master recording to a lower sampling frequency.

37. The method of claim 36, further comprising:

upsampling said reduced digital reproduction to said original sampling frequency prior to forming said residual.

38. The method of claim 34, wherein said master recording is a digital recording characterized by an original number of bits per sample, and wherein the deriving of said reduced digital reproduction comprises truncating said master recording to a lesser number of bits per sample.

39. The method of claim 34, wherein said master recording is characterized by an original sampling frequency and by an original number of bits per sample, and wherein the deriving of said reduced digital reproduction comprises downsampling said master recording to a lower sampling frequency and truncating the resultant signal to a lesser number of bits per sample.
40. The method of claim 39, further comprising:  
upsampling said reduced digital reproduction to said original sampling frequency prior to forming said residual.
41. The method of claim 37, further comprising:  
adding dither to said reduced digital reproduction subsequent to downsampling said master recording but prior to recording reduced digital reproduction.
42. The method of claim 41, wherein said dither is reversible, further comprising:  
subtracting said dither prior to upsampling said reduced digital reproduction.
43. The method of claim 38, further comprising:  
adding dither to said reduced digital reproduction prior to truncating said master recording.
44. The method of claim 43, wherein said dither is reversible, further comprising:  
subtracting said dither prior to forming said residual.
45. The method of claim 40, further comprising:  
adding dither to said reduced digital reproduction prior to truncating said resultant signal.

46. The method of claim 45, wherein said dither is reversible, further comprising:

subtracting said dither prior to upsampling said reduced digital reproduction.

47. The method of any of claims 42, 44, or 46, wherein said control information further includes data which characterize how said dither can be reversed.

48. The method of claim 34, further comprising:  
compressing said residual prior to its recording.

49. The method of claim 48, wherein said control information further includes data on how the compressing is performed.

50. The method of claim 33, wherein the recording of said reduced digital reproduction is performed onto a rewritable memory.

51. The method of claim 50, further comprising:  
compressing said reduced digital reproduction prior to its recording.

(Claims 52-70 have been cancelled.)

71. A method for storing an N-channel audio signal, wherein N is an integer greater than two, comprising:

deriving from said N-channel audio signal a two channel representation;

recording said two channel representation on a first medium;

forming additional information, comprising:

a residual dependent upon the difference between said N-channel audio signal and said two channel representation; and

control information, including data that can be used to recombine said residual with said two channel representation to reconstruct an M-channel

representation of said N-channel audio signal, wherein M is greater than two but not greater than N;

recording said residual on one or more second media; and  
recording said control information.

72. The method of claim 71, wherein said first media is the audio portion of a compact disk (CD), wherein said two channel representation can be reproduced on a conventional CD player.

73. The method of claim 72, wherein said recording of said control information is on said one or more second media, and wherein said one or more second media is the CD-ROM portion of said CD..

74. The method of claim 71, wherein M equals N.

75. The method of claim 74, wherein said residual contains (N-2) independent channels.

76. The method of claim 74, wherein said residual contains less than (N-2) independent channels.

77. The method of claim 71, further comprising:  
compressing said residual prior to its recording.

78. The method of claim 77, wherein control information contains data on how said residual is compressed.

79. The method of claim 71, wherein the deriving from said N-channel audio signal a two channel representation is based upon a linear combination of a finite set of spatial harmonics.

80. The method of claim 79, wherein said residual comprises a combination of zero and first order spatial harmonics which is linearly independent of said two channel representation.

81. The method of claim 71, wherein the recording of said first medium is a rewritable memory.

82. The method of claim 81, further comprising:  
compressing said two channel representation prior to its recording.

(Claims 83-88 have been cancelled.)

89. A method of storing N-channel audio data on a CD, wherein N is greater than two, comprising:

storing a two track reduction of said N-channel audio data, wherein said two track reduction is reproducible by playing said CD on a conventional audio CD player; and

storing control information on said CD; and

storing additional audio data on said CD outside of said audio portion, wherein said two track reduction and said additional audio information can be combined through use of said control information to reproduce an M-channel representation of said N-channel audio data, wherein M is greater than two but not greater than N.

90. The method of claim 89, wherein said additional audio information is compressed.

91. The method of claim 90, wherein control information contains data on how said additional audio information is compressed.

92. The method of claim 89, wherein M is equal to N.

93. The method of claim 92, wherein said additional audio information contains (N-2) independent channels.

94. The method of claim 92, wherein said additional audio information contains less than (N-2) independent channels.

(Claims 95-106 have been cancelled.)